

Phys11 Power/Efficiency : W.S. - 40

- 1) A car accelerates. Its kinetic energy increases from 1.3×10^4 J to 4.7×10^4 J in 7.2 s. Find the power delivered by the engine (ignore friction).
- 2) A 45 kg boy runs up 5 flights of stairs in 9.5 s. Each flight is 3.2 m high. Find his power.
- 3) A 72 kg bricklayer carries 15 kg of bricks up a vertical height of 6.2 m in 23 s. Find his power.
- 4) A 1200 kg elevator is raised by an electric motor at a constant speed. It is raised through a height of 87 m in 35 seconds. Find the power.
- 5) A man pushes a box on the floor with a constant speed of 1.5 m/s with a force of 230 N. Find the power.
- 6) How much work is done by a 180 kW electric motor in one hour ?
- 7) Find the efficiency of a laser if 3.5 mW of light energy are produced while 65 mW of power are drawn from its power supply.
- 8) The power rating of an electric motor is 75 W. It can do 172 J of work in 2.5 s. Find the efficiency.
- 9) A 40. W light bulb is 5.0 % efficient. If the light is on for 3.5 hours, how many joules of light energy are produced? How many joules of heat energy are produced? (assume that energy lost is given off as heat)
- 10) A 95 hp motor moves a boat at a constant speed of 15 km/hr. Find the force of resistance of the water on the boat. (1.0 hp, or horsepower = 746 W)

Answers : 1) 4.7×10^3 W, 2) 740 W, 3) 230 W, 4) 2.9×10^4 W, 5) 350 W, 6) 6.5×10^8 J, 7) 5.4 %, 8) 92 %, 9) 2.5×10^4 J, 4.8×10^5 J, 10) 1.7×10^4 N.